GAS FORMATION AND NOISE IN HEAT INSTALLATIONS

Even if a heating installation has been planned following the best techniques and professionally installed, it can happen that during use, especially at the beginning, minor problems can emerge, such as the forming of gases inside the components or noise in appliances.
The causes for these are various. Here is all the necessary information to solve these problems (the following practical advice will assist in overcoming these problems).

GAS FORMATION

There are three main causes for the gas formation in the heating installations.
- The first one is due to air introduced during the operation of water filling or re-filling. During heating the dissolved gases split in the boiler, relocating as gas pockets in the top of the radiators because of the different specific weight. This phenomenon is temporary, in fact it ceases in a short time and it can only reappear if the system is partially or completely emptied of water. For this reason we suggest not emptying or removing any of the filling water, unless really necessary.
- The second cause is the presence in the installation of organic materials such as working residual or hemp for hydraulic use, that while decomposing develop natural gas in the upper side of the radiator.
Even this trouble is temporary and stops when the material completes its decomposition.
- The third cause with a more persistent development of gases is the water quality and its varying hardness due to regional differences. In fact the water on the way from the atmosphere to the sea absorbs carbon dioxide and mineral substances from rocks and soils in different quantities, without mentioning the various pollutants produced by humans.
When particularly hard water is introduced into the heating installation, it begins to react with its metallic components, producing chemical and electrochemical processes (corrosion), with varied gas production, especially of hydrogen.
This phenomenon can continue for a long time thus damaging the installation, unless the UNI-CTI 8065 rule, which foresees the treatment of filling waters, is observed.
If the previously-mentioned causes are present, the gas mixture vented from radiators is quantatively composed of:

carbon dioxide CO_2
nitrogen N_2
hydrogen H_2
methane CH_4
oxygen O_2

We can summarise the main gas problems as follows:

- noise in the system fluid
- reduction or interruption of the water circulation in the heating elements
- insufficient warmth in the environment due to lower output from the radiators
- corrosion of various installation components

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Cure

When the causes which produce the gas in the installation are known, the under-mentioned operations must be followed.

- first of all a thorough washing of the installation before the final filling is necessary. Circulation flushing contributes to remove the residue responsible for gas production. After a few hours the water must be drained by opening the draincock.
- refill the installation possibly using water with hardness between 12 and 14 French degrees and a pH between 6,5 and 8 (do not use softened water).
  When the filling water operation ends, the temperature of the working fluid has to reach 85-90° C, to facilitate the division of the air in solution.
- The produced air pockets can be eliminated by venting the radiators and circulating pipes with bottle vents and/or automatic air bleed valves.
- If the filling water has degrees of hardness and pH which are different from those recommended, the phenomenon of gas production can cause corrosive processes in the installation and is therefore difficult to eliminate.

Considering impraticable the solution making follow every establishment by a laboratory specialized in the treatment of the water, for evident reasons of practicality and cost, we propose as remedies the following simple interventions that the experience has confirmed valid as much:

- as a remedy we suggest installing a floating automatic air vent valve;
- add to the filling water the Cillit-HS 23 Combi, or similar inhibitor which prevents corrosion and gas production;
- as a precaution do not completely close the flow and return valves in order to prevent an excessive build-up of pressure.

NOISE

Radiators are involved when noise in heating appliances occurs. Accurate tests have demonstrated that radiators do not cause the trouble but are simply the vehicle of noise produced somewhere else. The following list indicates the main causes for poor functioning of the installation and for a badly compensated thermal expansion:

- excessive speed of the water producing a noise similar to an open stopcock
- air presence in the upper side of the radiator with the particular noise of flowing water, due to the incomplete filling of the radiator.
  These problems do not appear if the delivery pipe connection lies below as used in 'mono pipe installation' or Modul system with UNIVER valve
- the circulation pump of the fluid working outside recommended limits causing resonance especially in the radiators
- wall brackets out of alignment causing noises similar to metallic blows during the heating or cooling phase due to badly compensated thermal expansion. The noise is transferred from the pipes onto the heating appliances with the typical 'ticking' reappearing at every thermal variation. The copper pipes with insulation are noise free.

Cure

- The ground noise due to water speed and turbulence on entering the radiator can be eliminated by working on the regulation valve to correct the water delivery as projected. However if the noise continues, it is possible to solve the problem with a diam. 18 mm diverter directly connected to the entrance valve of the radiator in order to convey the water to the next element of the radiator.
- The noise caused by the air presence in the radiator can be eliminated by installing a floating automatic air vent valve.
- The resonance of the circulation pump disappears by adjusting the pump head or revolutions (see instruction booklet). In some cases it is necessary to install an expansion joint between pump and pipes.
- The noise of thermal expansion can be eliminated by covering the bracket with a rubber sheath.
- To avoid noise in expanding pipes, it is necessary to use pipes fitted with insulating sleeves.

We hope that these brief notes will be of use in the solution of problems connected to modern systems, and will contribute to a wider knowledge and use of aluminium radiators.

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